



POLLUTION PREVENTION ACCOMPLISHMENTS

**PREPARED BY
THE OFFICE OF POLLUTION PREVENTION
AND
TECHNOLOGY DEVELOPMENT**

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"Waste is worse than loss. The time is coming when every person who lays claim to ability will keep the question of waste before him constantly."

Thomas A. Edison

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EXECUTIVE SUMMARY

This document was prepared by the Department of Toxic Substances Control (DTSC), Science, Pollution Prevention and Technology Program, Office of Pollution Prevention and Technology Development (OPPTD). The purpose of this document is to report the significant accomplishments and activities of OPPTD between January 1996 and December 1998.

OFFICE OF POLLUTION PREVENTION AND TECHNOLOGY DEVELOPMENT

DTSC's pollution prevention program contributes significantly to the overall effort to help California businesses properly manage hazardous waste thereby protecting public health and the environment. Pollution prevention, also known as source reduction, consists of a variety of techniques that stress preventing a waste from being generated so as to avoid costly and sometimes dangerous waste management activities. Reducing waste results in increased efficiency for facilities. Cost savings also result from reducing waste management costs, raw materials costs, and reduced insurance and worker safety costs, among other factors. Pollution prevention can also result in enhanced compliance.

OPPTD promotes pollution prevention and environmental technologies through demonstration projects, technology certification, and providing guidance and assistance to generators, technology developers, local governments and other environmental regulatory agencies.

The pollution prevention program is comprised of various elements that, in concert, provide a comprehensive statewide hazardous waste pollution prevention program.

Source Reduction Planning

The Hazardous Waste Source Reduction and Management Review Act of 1989 (Senate Bill 14, a.k.a. SB 14) is the cornerstone of California's hazardous waste source reduction program. This law requires generators to conduct an analysis of source reduction opportunities and to document this effort in a written plan. Since the first plans were prepared in September 1991, OPPTD has analyzed approximately 833 plans, 233 of them in the last two years. The purpose of the reviews is threefold; (1) to ensure that generators have complied with the law; (2) to use the review as an opportunity to provide generators with technical assistance, and guidance so as to motivate individuals to implement additional pollution prevention projects; and (3) to identify successful pollution prevention technologies and strategies that can be used by other similar businesses.

OPPTD's staff reviews of SB 14 source reduction documents have revealed some impressive statistics on industry progress in hazardous waste source reduction. OPPTD's 1997 petroleum industry study found that waste decreased by 32 percent, comparing 1990 to 1994,

equating to 61,000 tons annually. The 1997 review also found that between 1994 and 1998, the industry plans to implement over 120 source reduction measures that will potentially reduce annual waste generation by an additional 53,000 tons. Depending on prevailing disposal costs, annual waste disposal cost savings from implementing these measures is estimated to be between \$7 and \$40 million.

A review of the polymers and resins manufacturing industry found that all of the 31 facilities reviewed instituted source reduction measures that resulted in measurable source reduction. Comparing 1990 to 1994, the total waste shipped offsite from the 31 facilities studied for the report decreased by 27 percent. One of the facilities in the study reduced waste generation by over 75 percent.

In another assessment, 65 percent of the 75 metal finishing companies reviewed had taken measures to reduce hazardous wastewater generation. The current emphasis in this industry is reducing or eliminating wastewater discharge through employing “closed-loop” processes, or facility-wide “zero water discharge” systems. For example, one company achieved zero water discharge by installing an ion exchange system to recycle its metal-bearing rinse waters. After installing the ion exchange system, the company reduced water purchases and treatment costs from \$29 per 1000 gallons to between \$6-\$8 per 1000 gallons.

In its study of chemical products manufacturers and biotechnology and pharmaceutical companies, OPPTD determined that the total quantity of hazardous waste shipped offsite from the 40 companies included in the study decreased by approximately 17 percent from 1990 to 1994. While this industry had successfully identified source reduction opportunities, the study determined that opportunities exist to improve this industry’s documentation of source reduction implementation.

A comparison of 1990 and 1994 manifest data from paint manufacturers showed that quantities of solvent wastes decreased by 40 percent. Some of the greatest improvements in waste generation were a 73 percent reduction of oxygenated solvents and a 52 percent reduction of paint sludge.

An OPPTD study of the hospital industry found that most hospitals were subject to SB 14 based on the generation of photochemical/photo-processing wastes generated from X-ray development. Conversion to digital imaging has the potential to eliminate these wastes. Other source reduction measures being implemented by hospitals are substitutions for solvents, mercury products, and batteries.

The information above is contained in industry-specific reports that are produced by OPPTD as a means of sharing the information gathered through the plan review process. These reports include information on specific production processes, waste types, quantities and sources of generated waste streams, and source reduction and waste management practices implemented by the industry. Since enactment of SB 14, eight industry assessment reports have been

published. In addition to the industry specific reports, two cross-industry reports were developed to examine pollution prevention opportunities for either specific waste types or classes of generators based on other criteria. During fiscal years 96/97 and 97/98, reports were completed on the petroleum industry, chemical manufacturers, hospitals and California's largest hazardous waste generators.

Regulatory Compliance

OPPTD and DTSC's Hazardous Waste Management Program (HWMP) have worked together to establish a comprehensive approach to integrating source reduction into regulatory programs such as permitting, inspections, and enforcement. Because source reduction is a generator issue, most of the DTSC's pollution prevention regulatory integration efforts is occurring within the Statewide Regulatory Program Division's (SRPD) activities. The SRPD is charged with developing, overseeing, and evaluating local hazardous waste inspection agencies. These "certified unified program agencies" (CUPAs) are responsible for inspecting generator and tiered permitting facilities in California. Since 1996, OPPTD has trained 228 staff in over 45 local regulatory agencies in pollution prevention and SB 14. Additionally, OPPTD partnered with local inspection programs to assist in bringing SB 14 violators into compliance.

Additional ongoing pollution prevention regulatory integration efforts involve updating the Hazardous Waste Permit Writer's Guidance Manual to make the required pollution prevention language consistent with SB 14, incorporating pollution prevention as Supplemental Environmental Projects (SEPs) within enforcement settlements, establishing pollution prevention as one of the factors for assessing CUPA performance, and improving the coordination between OPPTD's review of SB 14 plans and the renewal of facility permits.

Training and Education

To promote source reduction, OPPTD maintains an aggressive outreach and education program. Training sessions target hazardous waste generators, consultants, government employees, and the general public. The sessions are presented in cooperation with industry associations, public interest groups, academic institutions, and other agencies of state, federal, and local government. Over the last two years over 60 workshops, training sessions, and presentations were given to approximately 2700 people.

OPPTD has produced over 150 publications and videos. These publications are continuously updated or replaced with new material as experience is gained, technologies improved, and new strategies developed. During the past two years, nine new publications were released and three documents were updated. OPPTD currently offers over 85 different documents and videos and distributes approximately 11,000 copies of these documents and videos each year.

Support for Local Government

OPPTD is a leading participant in ten local and regional pollution prevention roundtables, which target a variety of industries and pollution prevention issues. OPPTD provides logistical support and serves as a vital communications link between these regional groups. OPPTD also sponsors or co-sponsors an annual conference, which brings together local government pollution prevention advocates to foster information sharing, identify barriers and solutions, set priorities, develop new initiatives and encourage partnerships. It was this network of local government programs that originated the idea for Pollution Prevention Week, which has now become a national event.

Also supported by OPPTD is the Bay Area Green Business Program, which is designed to give recognition in the market place to small and medium-sized businesses that go beyond compliance. The project involves counties and cities throughout the San Francisco Bay Area. To date, program guidance has been developed for auto repair shops, printing, and dry cleaners. Work is underway to develop criteria for the wine industry. The plan is for local governments to give recognition to businesses which meet or exceed the criteria and encourage the public to seek out these companies.

Federal Facilities

In addition to supporting local government, OPPTD provides pollution prevention support to federal facilities. Through OPPTD's initiative and the leadership of the Navy, a formal information sharing network was established among Department of Defense (DOD) facilities in California. The DOD Pollution Prevention Roundtable met two or three times a year for the last four years. This effort has resulted in improved coordination between federal source reduction planning efforts mandated by Executive Order 12856 and the state planning requirement (SB 14). In addition to working with DOD, OPPTD has worked with U.S. Post Office and Department of Energy facilities.

Grants

OPPTD utilizes federal grant funding to support some of its activities. Three Pollution Prevention Incentives for States grants allow OPPTD to support local government pollution prevention programs, evaluation of environmentally preferable products for use in the building maintenance industry, and information clearinghouse activities as they relate to the establishment of a formal Western Regional Pollution Prevention Network, which covers all of U.S. EPA, Region IX.

Community Involvement

OPPTD conducted a series of partnership projects with public interest community organizations to encourage greater public awareness about pollution prevention and the community-right-to-know provision of SB 14. This provision states that generators' SB 14

documents "shall be made available locally for public review." The goal of these projects was to increase community interest in SB 14, thereby motivating businesses to improve their documentation of source reduction planning efforts. This project was inspired in part by the Emergency Planning and Community Right-to-Know Act (EPCRA). One of these partnerships resulted in 20 or more high tech companies in the Silicon Valley reassessing and updating their source reduction plans and efforts.

National and International Efforts

OPPTD is developing source reduction projects in the Mexico Border area. The Border XXI Program, is a bi-national effort designed to improve the environment along the U.S./Mexico border through sustainable development by balancing social, economic, and environmental factors. OPPTD's staff have conducted and participated in a number of pollution prevention training and educational outreach events in conjunction with this project.

OPPTD also works with the National Pollution Prevention Roundtable (NPPR). Projects completed under the auspices of the NPPR include providing input on the reauthorization of the Pollution Prevention Act of 1990, a "white paper" on the effectiveness of facility pollution prevention planning efforts, and ongoing analyses of pollution prevention program measurement.

Pollution Prevention versus Source Reduction

In the arena of hazardous waste, and in this report, one will inevitably come across two terms "pollution prevention" and "source reduction." Over time, the two terms have come to mean the same thing and are used interchangeably in this document. Both terms are based on the concept that if hazardous pollutants are not produced, they cannot pose a risk to the environment; the emphasis is on preventing the generation at the source, or point of generation.

INTRODUCTION

OPPTD has long recognized the importance of preventing the generation of wastes at the source. Wastes are resources that businesses and consumers pay for but do not use. Controlling wastes, after they have been generated, is expensive. Additionally, the cost for disposing of wastes and the uncertainty of potential future liabilities from improperly disposed wastes can adversely affect a company's profitability. Experience has shown that in most cases it is cheaper and more profitable to design or redesign manufacturing processes so that waste generation is either eliminated or reduced.

OPPTD has always been a national leader in assisting industry to eliminate or reduce the generation of wastes. Due to California's size and large industrial base, OPPTD uses a multitude of approaches to assist industries with the implementation of pollution prevention programs. This document discusses the accomplishments of recent programs and approaches utilized by OPPTD to help businesses eliminate or reduce the generation of wastes, protect the environment, and in many cases achieve higher levels of efficiency, saving money and conserving natural resources at the same time.

The cornerstone of OPPTD's program is the Hazardous Waste Source Reduction and Management Review Act of 1989 SB 14. Since 1991, OPPTD has worked with industry to develop effective source reduction plans and has reviewed approximately 833 plans. As a result of these plan review efforts, eight industry-specific assessment reports and one pollution prevention guide detailing source reduction accomplishments were developed and published by OPPTD. Additionally, two cross-industry reports were developed that examine pollution prevention opportunities for either a specific waste stream or classes of generators based on other criteria. The latest assessment report examines the source reduction progress of California's largest hazardous waste generators, including DOD facilities, based on both landfill disposal and overall generation.

Businesses, generally, support the concept of source reduction. However, some have not taken the time to identify how their manufacturing or service processes can convert to less wasteful systems, or they have been unable to find the information they need to make such conversions. OPPTD strives to assist industries to overcome these barriers to implementing pollution prevention programs by conducting research on pollution prevention technologies and techniques, publishing the results of the research, disseminating the results to the appropriate audiences, and conducting training and outreach activities to those that need the assistance.

OPPTD has either developed or assisted in the development of approximately 85 technical pollution prevention documents and videos describing successful source reduction techniques for California Industries. These documents are utilized by industry, government agencies, and national and international organizations, and agencies world wide.

Over the last couple of years, a massive effort was undertaken to phase out the use of solvents due to their ozone depleting properties and their volatile organic compound emissions. OPPTD worked extensively to provide guidance on the conversion from solvents to more environmentally-friendly aqueous-based chemistries; Chapter Three of this report describes in detail OPPTD's efforts to assist industries in making this conversion.

OPPTD has a rich history of working with and supporting local government efforts to implement pollution prevention programs within their communities. OPPTD was instrumental in establishing ten local and regional pollution prevention roundtable committees that meet regularly to discuss the latest developments in pollution prevention and to share information and experiences. OPPTD staff routinely attend these committee meetings and provide logistical support serving as a vital communication link between the committees.

The chapters that follow discuss some of the major, successful pollution prevention efforts of OPPTD since 1996, as well as some of its minor accomplishments. This document is intended to give the reader a general understanding of the status of hazardous waste source reduction in California, and the benefits of including pollution prevention as a major component of the state's hazardous waste management program.

CHAPTER ONE: SB 14 IMPLEMENTATION

The Hazardous Waste Source Reduction and Management Review Act of 1989 SB 14 is the cornerstone of source reduction in California for generator facilities, the public, and the DTSC. This legislatively mandated program has been tremendously successful in moving facilities toward implementation of source reduction measures resulting in greater environmental protection and in many cases cost savings for the implementing facilities. The intent of the bill was to require facilities to identify and evaluate viable source reduction options, with the assumption that facilities will find cost-effective options and will implement them voluntarily. What follows is an overview of the details of the program and some of the successful results over the last couple of years.

OVERVIEW OF SB 14 GENERATOR REQUIREMENTS

SB 14 applies to businesses that routinely generate over 12,000 kilograms (13.2 tons) of hazardous waste, or 12 kilograms of extremely hazardous waste, in 1990, 1994, 1998 and in succeeding reporting years, which occur at four year intervals. Affected generators must prepare a Source Reduction Plan (Plan), a Management Performance Report (Report), and a Summary Progress Report, that demonstrate a facility's efforts to identify, evaluate, and implement feasible source reduction measures.

The Plan, a prospective document, must include information about the facility's operations, including a description of its production process and waste generation data for the most recent reporting year. Plans must also list potential source reduction alternatives for routinely-generated major waste streams. ("Major" is defined as any hazardous waste stream which is five percent or more of a generator's total generated hazardous waste.) The Plan explains the generator's rationale for determining why measures are considered either feasible or infeasible, and discusses specific criteria such as economics, source reduction potential, technical considerations, impacts on air, water, and land, and health and safety implications for each potentially feasible source reduction alternative. The Plan includes a schedule for implementing feasible source reduction measures, and establishes a source reduction goal (percent) that serves as an optimal target that could be reached over the four-year planning period.

The Management Performance Report (Report) is a retrospective document that discusses waste stream management for the reporting year. The Report also describes past experiences with source reduction measures, changes in waste management methods, and factors such as production throughput and new or discontinued products that have affected waste generation since the previous reporting year.

Plans and Reports must include certification statements signed by responsible parties. This certification is designed to demonstrate management awareness of, and financial commitment for implementation of the source reduction measures identified in the plan.

The Summary Progress Report, established in 1997, summarizes the results of implementing the source reduction methods identified in the Plan over the previous four years. The Summary Progress Report also estimates the amount of reduction projected for the next four years.

THE SB 14 REVIEW PROCESS

To select candidate facilities for review, OPPTD examines DTSC's manifest database and environmental reports such as the Toxics Release Inventory and the U.S. EPA biennial Hazardous Waste Report (Biennial Generator Report). Classes of generators, and the quantities and types of waste generated by these entities, are identified. The document review process is initiated by mailing to the generator facilities a certified letter requesting that the facility send its completed source reduction documents to OPPTD within a 30 day period. Once received, SB 14 documents are reviewed for compliance using a completeness checklist (found in Appendix G of the Source Reduction Guidance Manual). As OPPTD staff examine these documents, innovative source reduction measures that are documented in the plans are noted for use in a final report for the specific industry sector.

After the review is completed, a letter and a copy of the checklists used by the reviewer is mailed to the generator. In cases where documents are deficient in meeting the law's requirements, the letter serves as a Notice of Noncompliance (Notice). The Notice identifies the deficiencies, asks the generator to make appropriate document revisions, and requests document resubmittal within 60 days. When documents contain only minor deficiencies, needed revisions are identified and resubmittal is not usually required. During the review period, staff often interact with the facility personnel or consultant, and sometimes visit the facility. Information gathered from facility visits often supplements the data gathered in the SB 14 documents. These visits also provide OPPTD staff the opportunity to provide direct technical and regulatory assistance.

OPPTD has reviewed the SB 14 documents of approximately 833 facilities since 1991, 233 since 1996. From these data, OPPTD has conducted eight industry assessments and two cross-industry assessments. The most recent five industry assessments, and the pollution prevention guide for hospitals, are summarized below. Previous assessments completed prior to 1996 include those of the aerospace, petroleum refining, and semiconductor industries, and one assessment on 1,1,1 TCA. An assessment of California's largest hazardous waste generators recently was also completed and is now available.

INDUSTRY ACCOMPLISHMENTS

An important component of OPPTD's program is to inform industries about source reduction technologies and techniques that are successfully utilized in similar industries. OPPTD engages in this information transfer by studying the source reduction practices of specific industries through the review of source reduction plans, and then disseminating this information through various publications, workshops and conferences. Industry reports are one of the key types of publications produced by OPPTD. SB14 stipulates that the purposes of the document reviews are to ensure that the selected generators comply with the law, to identify successful source reduction approaches, and to disseminate this information to other generators within the generator business category studied. The assessment reports include information on industry production processes, waste types, quantities and sources of generated waste streams, and source reduction and waste management practices implemented by the industry.

Recent SB 14 assessments are summarized below. Full reports are available from OPPTD. See the Publication List, Appendix B, for details. Refer to the document numbers in the following paragraphs.

Petroleum Refining Industry

Findings from industry assessments have yielded some impressive statistics on this industry's progress in hazardous waste source reduction. For example, an initial review of the petroleum industry (mostly refineries) completed by OPPTD in early 1993 found that among the 18 facilities studied, over 80 source reduction measures were planned for implementation between 1991 and 1994. OPPTD estimated that these measures had the potential to reduce industry waste by 20 percent, excluding wastewater treated and discharged to Publicly Owned Treatment Works (POTW), with a resulting disposal cost savings of between 7.6 and 45 million dollars annually. Data gathered from OPPTD's 1997 petroleum industry follow-up study found that non-POTW waste actually decreased by 32 percent comparing 1990 to 1994. This reduction in waste generation equates to 61,000 tons annually. The 1997 review also found that between 1994 and 1998 the industry plans to implement over 120 source reduction measures that can potentially reduce annual waste generation by an additional 53,000 tons. Depending on the disposal method, landfill or incineration, annual waste disposal cost savings from implementing these measures is estimated to be between \$7 and \$40 million dollars. (See Appendix B. Order document # 536.)

Polymers and Resins Industry

A review of the polymers and resins manufacturing industry found that all of the 31 facilities reviewed for the report instituted source reduction measures that had measurable waste reduction results. Some of the largest waste streams produced by this industry included spent cleaning solutions, and process condensates containing solvents and monomers, waste oils, waste resins, and container wastes. Some of the source reduction measures instituted by polymer/resin facilities included using sealless pumps, configuring reactor and filtering systems for in-process recovery of process

wastes, improving batch production scheduling, and using air pressure and pigs to clear product or raw material transfer lines. Comparing 1990 to 1994, the total waste shipped offsite from the 31 facilities studied for the report decreased by 27 percent. One of the facilities in the study reduced waste generation by over 75 percent.

(See Appendix B. Order document # 533.)

Metal Finishing Industry

Seventy-five companies were reviewed for this assessment report which found that the largest waste stream produced by this industry is wastewater generated from surface preparation, treatment, and plating baths. Since 1991, 65 percent of the facilities assessed in this study have taken measures to reduce hazardous wastewater generation. The most commonly implemented source reduction measures included incorporating flow restrictors and other water control devices, countercurrent rinsing, spray rinsing, rinse water agitation, drain boards, and extending drain times.

The current source reduction emphasis in this industry is towards reducing or eliminating wastewater discharge through employing “closed-loop” processes or facility wide “zero water discharge” systems. These systems typically recover metals and chemicals for in-process reuse. Technologies, such as ion-exchange and reverse osmosis are predominant in “closed loop” or “zero water discharge” facility configurations. As an example, one company achieved zero water discharge by installing an ion exchange system which recycled its metal-bearing rinse waters. After installing the ion exchange system, the company reduced water purchase and treatment costs from \$29 per 1000 gallons to between \$6-\$8 per 1000 gallons.

(See Appendix B. Order document # 534.)

Chemicals and Allied Products Industry

This industry review included chemical products manufacturers and biotechnology and pharmaceutical companies under seven SIC code classifications. According to OPPTD records the total quantity of hazardous waste shipped offsite (manifested) from the 40 companies included in the report decreased by approximately 17 percent comparing 1990 to 1994. The largest waste streams generated by these facilities were solvent wastes from production processes, equipment cleaning, research activities, off specification product, and inventory wastes. Another large waste stream was acidic waste water produced from regenerating the resins in water deionization equipment. Some of the more interesting source reduction measures implemented in this industry included reverse osmosis water purification technologies combined with deionization units, the redesign of reactor systems for in-process recovery and reuse of catalysts, computerized inventory and raw material tracking systems that use bar coding technology, narrow bore column high pressure liquid chromatography instruments, and pyrolysis cleaning systems for small reactor and mixing vessels. Source reduction possibilities in this sector that warrant additional research include ultraviolet light and catalyst-based water purification technologies to replace chemical and filter methods, and catalytic solid phase gas reaction systems to replace liquid phase systems which generate solvent wastes. (See Appendix B. Order document # 537.)

Paints and Coatings Industry

OPPTD conducted a study in 1995 of 26 companies that manufacture paints, varnishes, lacquers, sealers and enamel products. A comparison between 1990 and 1994 manifest data showed that quantities of solvent wastes decreased by 40 percent. Some of the greatest improvements in waste stream generation were a 73 percent reduction of oxygenated solvents and a 52 percent reduction of paint sludge. The largest source of solvent waste generation in this industry was from equipment cleaning. Source reduction measures employed by this industry which reduce the need for equipment cleaning include light-to-dark batch scheduling and dedicating mills for same color formulations. Other source reduction measures include reusing wash solvents and replacing wash solvents with water-based cleaning products.

(See Appendix B. Order document # 532.)

Hospital Industry

This assessment found that most hospitals were subject to SB 14 based on the generation of photochemical/photo processing wastes generated from X-ray development. Conversion to digital imaging has the potential to eliminate photochemical/photo processing wastes. Other source reduction measures being implemented by this industry are substitutions of solvents, mercury products, and batteries. This recently completed assessment examined the SB 14 documents of 29 hospitals and medical facilities and served as the basis for creating the "Pollution Prevention Guide for Hospitals" (Guide). The Guide features sixteen case studies.

(See Appendix B. Order document # 413.)

SB 14 COORDINATION WITH FEDERAL POLLUTION PREVENTION EFFORTS

In March 1995, President Clinton signed Executive Order (EO) 12856 which requires federal facilities to develop and implement multi-media pollution prevention plans. In support of this order, OPPTD developed and implemented Department of Defense (DOD) pollution prevention roundtables as forums to facilitate information exchange and pollution prevention ideas. As of the date of this writing, ten round table meetings have been held. One issue discussed in these roundtables was how the pollution prevention plans required by the EO relate to the California-required SB 14 documents. The Navy's guidance for developing the pollution prevention plans required by EO 12856 was submitted to OPPTD by the Navy's Office of Regional Environmental Coordination. Extensive review of this material found that the plan was sufficient for meeting the requirement of the SB 14 program, with a few minor additions. OPPTD authorized the Navy to submit their pollution prevention plans with the additions in lieu of the SB 14 plans, thereby avoiding duplication of effort. Since this action, OPPTD has granted similar authorization to the U.S. Postal Services after reviewing their plan guidance documents. Other federal agencies pursuing this course of action include the Marine Corps, the Department of Energy, and the U.S. Air Force.

THE PUBLIC'S ROLE IN SB14 SOURCE REDUCTION PLANNING

SB 14 contains a “community-right-to-know” provision, which states that generators’ SB 14 documents “shall be made available locally for public review”. During 1995-1997 OPPTD conducted a series of partnership projects with community public interest organizations to stimulate greater public awareness about the community-right-to-know provision in SB 14. The goals of the projects were to increase community interest in SB 14 and to motivate firms to improve their documentation of source reduction planning efforts. This project was inspired in part by the Emergency Planning and Community Right-to-Know Act (EPCRA). Experience with this federal law illustrates that public disclosure of environmental reporting information has a powerful influence upon the regulated community. EPCRA requires certain facilities to quantify and report the amounts of chemicals in wastes and emissions released to the environment. Data collected from these reports is accumulated into a large database called the Toxics Release Inventory, which is publicly accessible. According to the US Environmental Protection Agency, between 1988 and 1995, facilities subject to EPCRA reduced their reported releases by 46 percent.

OPPTD began outreach to community groups by first conducting a pilot project with the Sacramento Valley Toxics Coalition (SVTC). The project objectives were to facilitate and fund this group’s examination of SB 14 regulated facilities in the Sacramento metropolitan area. SVTC selected the facilities to be reviewed and contacted the companies. Copies of SB 14 documents were reviewed with an OPPTD-supplied completeness checklist. SVTC supplied feedback to the companies about the documents, and then reported to OPPTD, describing the experience. The lesson learned from this pilot effort was that many businesses were unaware of SB 14's public access provision. Increasing business awareness about this provision became an objective of the succeeding two projects, conducted in 1996-1997. We also learned that some businesses would respond to feedback from public interest groups, and that the checklist-guided reviews helped some firms to better comply with the law.

The second project involved five organizations; the Planning and Conservation League, Madres de Este Los Angeles, the Peninsula Conservation Center Foundation, the Quality Community Alliance, and Communities For a Better Environment. These projects were similar to the initial project. OPPTD conducted a day-long SB 14 orientation training for project participants. Written training materials were provided to the reviewers and the strategy for dealing with uncooperative businesses was prescribed. This strategy included document requests by OPPTD and/or referral to DTSC’s Office of Legal Affairs. The contract with the five organizations specified that the groups include in their final summary reports to OPPTD suggestions on how the project and the SB 14 program, including SB 14 legislation, could be improved.

The third project began in May 1997, and also involved five organizations, the Planning and Conservation League, Madres de Este Los Angeles, the Peninsula Conservation Center Foundation, the Silicon Valley Toxics Coalition, and the Bay Area Chapter of the Sierra Club. Several project modifications were incorporated according to the community groups suggestions. For example, to help

the groups members better understand and disseminate public information about SB 14, a brochure was created entitled "The Citizen's Guide to SB 14." To help document requestors gain more timely access to SB 14 plans and reports, DTSC's Legal Office prepared a letter for requestors to show businesses which discussed the SB 14 public access requirements and DTSC's intention to enforce the provision, with penalties if necessary. In addition, the checklists were modified to include more detailed document-related feedback.

This third project, completed in November 1997, successfully demonstrated that many businesses have become aware of SB 14's public access provisions and have shown increased openness to receiving feedback from the community. Several firms perceived to be in a state of minimal compliance agreed to modify documents as a result of the feedback they received from local groups. These three projects have acted as a catalyst to stimulate public interest in SB 14. Awareness was raised regarding public access to pollution prevention planning documents. More groups will, on their own initiative, request SB 14 documents from facilities in their communities to gauge pollution prevention commitments. Better source reduction planning will most likely be the result.

SB 14 Case Study, Century Laminators, Inc.

Century Laminators, Inc. is a small (about 140 employees) printed circuit board manufacturer located in Anaheim, California. Although Century Laminators had already implemented some source reduction opportunities, the structured, systematic approach of SB 14 apparently provided added benefit. The source reduction plan submitted to OPPTD by Mr. Chris Hensley, facility manager, scheduled the following source reduction options for implementation:

- increase concentration of copper in etchant. This would result in an annual savings of \$9,200, and reduce waste by 10% (37 tons).
- Reduce cleaning schedule. This would result in an annual savings of \$7,700, and would reduce sludge production by 2% (1.5 tons/year).
- Install automatic flow sensors for rinses. This would result in an annual savings of \$8,250, and would reduce the potential for operator error that would increase sludge generation.
- Install automatic fluid dispensers (floor cleaner). This would result in an annual savings of \$8,850. Operator error had resulted in excess sludge generation due to improper mixing of the floor cleaner.
- Install panel sensors on ASI equipment. This would result in an annual savings of \$2,455.
- Modify oxide racks to increase drainage efficiency (cost benefit not quantified).
- Increase rack drip times. Potential reduction of dragout of 50%.

In August of 1998, OPPTD requested follow up information from Century Laminators, Inc. Mr. Hensley, now the Vice President of Business Development, is enthusiastic about the source reduction planning program. In a letter to OPPTD, he states “The program has in fact been instrumental in changing our thinking in terms of modifying what we currently do, and in evaluating processes, equipment, and chemistries for future use. The modifications that were completed first due to their ease of implementation and low cost were not the greatest opportunities for reduction, but they did provide a smooth transition into the program and were carried out with enthusiasm and precision. These included increased drip times on our oxide line, rack modifications, and the installation of an automatic floor cleaning dispenser.”

Century Laminators, Inc.'s manifest data indicate source reduction progress:

<u>Ship Year</u>	<u>Total Tons</u>
1995	524
1996	459
1997	480
1998	343 (projected)

Century Laminators' 1998 waste is generated at a rate of approximately 6.6 tons per week. If we extrapolate to the end of the year, we see a total quantity of approximately 343 tons, a 25% decrease in waste from 1996 levels. These figures give us some idea of the effects of Century Laminators' source reduction efforts.

In his letter, Mr. Hensley's letter also said "The greatest opportunity for waste reduction was the increase of copper concentration In our etchant. The conversion to a more concentrated chemistry took longer than originally anticipated while we worked out production speed issues with the altered chemistry. This delay, along with an 8% increase in business, accounts for the apparent increase in waste production last year. But once we established a benchmark, we were able to increase concentration levels higher than originally anticipated. . Taking into account varying sales levels, technology (number of layers in boards and the copper thickness), and our fiscal year, our etchant production is down at least 5% from 1996 figures. The number could be greater--but we will be conservative until the calendar finishes and we have an actual count."

"Equally noteworthy is the tremendous assistance and professional attitude of the California Department of Toxic Substances Control. From the onset of our involvement with your group regarding the reduction plan, every contact has been knowledgeable and extremely helpful. Your guidance has been personalized and ongoing, quite unlike the often times overbearing approach of other government agencies. . . we appreciate your continued interest in our success with this program, and thank you most especially for helping one of the 'little guys'."

CHAPTER TWO: OUTREACH AND EDUCATION

An extremely important component of OPPTD's efforts to promote source reduction and compliance with SB 14 is its outreach and education program. OPPTD provides training sessions that target hazardous waste generators, consultants, government employees, and the general public. The sessions are presented at major conferences and in cooperation with industry associations, public interest groups, academic institutions, and other state, federal, and local government agencies. OPPTD is routinely called upon to provide presentations on the concepts of pollution prevention at training events throughout the state. About thirty training sessions have been conducted annually, reaching as many as 1350 attendees.

Recognizing the importance of technical pollution prevention information, OPPTD has produced over one hundred and fifty publications and videos. The publications are continuously updated or replaced with new material as experience is gained and technologies improve. During the past two years, eleven new publications were released and two documents were updated. OPPTD currently offers over 85 technical pollution prevention documents and videos, distributing approximately 11,000 documents and videos each year.

The newest publications are briefly described below. Copies of all publications may be obtained by phoning OPPTD at (916) 322-3670, or by faxing OPPTD at (916) 327-4494. See Appendix B of this document for a list of publications. Some documents are available on the World Wide Web via <http://www.dtsc.ca.gov/sppt/opptd/pubs/txpppubs.htm>.

UPDATED DOCUMENTS

Hazardous Waste Source Reduction Compliance Checklist, 1997, 24 pages, (Document # 004) and Diskette of Hazardous Waste Source Reduction Compliance Checklist, 1997, IBM PC Diskette (Document # 005). The Compliance Checklist is an alternate format of the Source Reduction Facility Planning Evaluation Review and Plan for small businesses.

Pollution Prevention Can Work For You, 1997, 6 pages (Document # 200) - A fact sheet summarizing general pollution prevention techniques that are applicable to many industries.

NEW DOCUMENTS

Pollution Prevention Planning: A Citizen's Guide to Hazardous Waste Source Reduction, 1997, 1 page (Document # 006) - A brochure for the public which explains the purpose and requirements of the Hazardous Waste Source Reduction and Management Review Act of 1989.

Paint Manufacturers Can Save Money on Environmental Compliance Costs, 1996, 4 pages (Document # 216) - A fact sheet showing how source reduction can save on environmental compliance costs by minimizing the generation of hazardous waste.

Pollution Prevention Checklist and Assessment Manual for the Electronics Industry, 1996, 76 pages (Document # 405) - A manual for the electronics industry to aid them in evaluating their shops for pollution prevention opportunities.

Pollution Prevention Guide For Hospitals, 1998, 140 pages (Document # 413) - A guide to assist hospitals in evaluating their operations for waste minimization opportunities. This document includes successful source reduction abstracts submitted by hospitals.

Assessment of the Polymers and Resins Industry Hazardous Waste Source Reduction Planning Efforts, 1996, 75 pages (Document # 533) - OPPTD's assessment of the polymers and resins industry's source reduction review and planning efforts as mandated under the Hazardous Waste Source Reduction and Management Review Act of 1989. This document presents the results of OPPTD's review of the Plans and Reports from 31 facilities.

Assessment of the Metal Finishing and Plating Industry Source Reduction Planning Efforts, 1996, 62 pages (Document # 534) - Summarizes the results of the DTSC's assessment of the metal finishing and plating industry's source reduction efforts as mandated by the Hazardous Waste Source Reduction and Management Review Act of 1989. This document presents the results of OPPTD's review of the Plans and Reports from 75 facilities.

Assessment of the Petroleum Industry Hazardous Waste Source Reduction Planning Efforts, 1997, 91 pages (Document # 536) - This second assessment of the petroleum industry highlights several successful source reduction measures leading to significant reductions of hazardous waste generation, and offers an interesting comparison of 1990 and 1994 source reduction progress. Future plans of the industry are discussed.

Assessment of Chemicals and Allied Products Industry Source Reduction Planning Efforts, 1998, 106 pages (Document # 537) - Presents findings from OPPTD's source reduction planning assessment of 40 facilities classified under seven SIC codes within the chemicals and allied products industry. This report contains descriptions of each of the 40 companies, discusses compliance issues, and lists source reduction measures for the industry.

Assessment of California's Largest Hazardous Waste Generators' Source Reduction Efforts, 1990-1994 and Beyond, 1998, 65 pages (Document # 538) - The source reduction documents of approximately 30 facilities, representing a wide range of manufacturing types which typically generate millions of pounds annually of hazardous waste, were reviewed. Results show that many facilities have decreased their hazardous waste generation due to the implementation of source reduction measures.

Zero Water Discharge in the Metal Plating Industry Using an Improved Ion Exchange Process, 1996, 6 pages (Document # 1600) - Ion exchange and evaporation are not new technologies. However the ion exchange regeneration process used at Gold Seal Plating located in Oakland, California has been improved by reusing portions of the regenerants. The reuse of regenerants drastically reduces the volume of generated aqueous wastes that require evaporation.

Monsanto: The Synergy Between Total Quality and Pollution Prevention, 1996, 8 pages (Document # 1601) - This case study describes the manufacturing process and specific process modifications, input substitutions, and operational changes that were implemented to reduce waste generation. The Monsanto Avon facility reduced waste by over 90 percent during a period in which production rose by 120 percent.

NEW DOCUMENTS PRODUCED WITH THE ASSISTANCE OF OPPTD

The following documents were produced by contractors with funding provided by U.S. EPA and/or OPPTD. These documents were prepared and published with the technical, printing, and distributing assistance of OPPTD.

Parts Cleaning in Auto Repair Facilities: The Conversion to Water Executive Summary, 1997, 4 pages (Document # 613) - Provides a brief overview of the results of a test and demonstration project in Los Angeles, California for water-based cleaning systems in auto repair facilities. Four types of equipment were investigated including a sink-on-a-drum remote reservoir configuration, an immersion system, an enzyme unit, and a spray cabinet. Four water-based cleaning formulations were tested. Three of these were alkaline cleaners and one was an enzyme cleaner.

Parts Cleaning in Auto Repair Facilities: The Conversion to Water, 1997, 80 pages (Document # 614) - This report presents the results of the test and demonstration project summarized in Document # 613. Information contained includes testing for technical feasibility, analysis of results, cost analysis, and project findings and implication. This report also contains Material Safety Data Sheets for the aqueous cleaning formulations used in the project.

Appendices to Parts Cleaning in Auto Repair Facilities: The Conversion to Water, 1997, 250 pages (Document # 615) - These appendices present the water quality data collected in the test

and demonstration project summarized in Document #613 and reported in Document #614. Data printouts include listing of inorganic and organic laboratory results.

FUTURE DOCUMENTS

Following are some of the documents near completion and expected to be available in early 1999.

Innovative Source Reduction Technologies for Printed Circuit Board Manufacturers -

Summarizes some of the innovative source reduction technologies that are being investigated or implemented by printed circuit board manufacturers as reported in their 1991 source reduction plans. Plans from 33 facilities were reviewed.

Assessment of the Printed Circuit Board Industry - As a continuation of its study of the printed circuit board industry, OPPTD will review approximately 60 to 85 of the 1995 source reduction plans from printed circuit board manufacturers. Source reduction activities applicable to this industry will be identified. The industry's achievements in reducing its waste as compared to 1990 will be documented.

ISO 14001 and SB 14 - This project is documenting the integration of hazardous waste source reduction planning into the environmental management systems developed by hazardous waste generators that are certified by the International Organization for Standardization (ISO) 14001 standards. The ISO 14001 standards are voluntary and include a broad range of environmental disciplines, including basic environmental management and auditing, evaluating performance, labeling, and life-cycle assessment.

CHAPTER THREE: SOLVENT ALTERNATIVES

OPPTD has developed a partnership with industry and other governmental agencies to evaluate pollution prevention techniques and technologies and promote them to California's businesses. One focus of this research has been the use of aqueous cleaners as substitutes for hazardous solvents in the automotive, furniture, and machining industries. Additionally, OPPTD is breaking new ground in conducting independent third-party evaluation of an aqueous cleaning system to bring pollution prevention technology into the marketplace. This evaluation, and other subsequent work being conducted by OPPTD, will establish standard protocols for the evaluation of aqueous cleaning technologies. This chapter contains summaries of OPPTD's efforts in evaluating and promoting aqueous cleaning technologies and other solvent alternatives.

The term "solvent" is used by industry to mean an organic solution used as a dissolving agent. Solvents have a wide variety of applications. The electronics and metal finishing industries commonly use solvents to clean surfaces prior to processing. The petroleum industry uses solvents to extract lubricating oils and waxes during the refining process. Solvents are a component in many paints and inks. The chemical and plastics manufacturing industries depend on solvents for many of their processes. Dry cleaning and equipment cleaning, especially parts degreasing, are commonly done with solvents.

A solvent must have certain properties to be effective in these uses. It must be able to dissolve materials. It must be stable and not react with storage containers and pipes. Often a solvent must be volatile and easily regenerated.

Unfortunately, the useful properties of solvents often make them incompatible with the environment. Solvents act to mobilize other hazardous wastes in land disposal facilities. It is also believed that solvents can change the characteristics of landfill liners and destroy the security of the sealed landfill bottom. Solvents are one of the major contributors to groundwater pollution. The stability of solvents causes them to resist natural breakdown in the soil. When exposed to the air, solvents readily evaporate, contributing to air pollution. Many industrial solvents are toxic and flammable.

SOLVENTS ALTERNATIVE PARTNERSHIPS

Through a series of grants and partnerships, OPPTD has established a working relationship with other agencies and nonprofit organizations to examine the feasibility and trade-offs of using aqueous-based cleaners as a substitute for cleaners containing volatile organic compounds (VOCs) and/or halogens in a variety of industries. The results of these test and demonstration projects, completed and in progress, will provide valuable information on product performance as well as the economic, environmental, and regulatory trade-offs. OPPTD's role in all of these projects has been to provide regulatory and pollution prevention expertise and to share technical information with local governments and regulated industries.

Alternatives to Mineral Spirits in Auto Repair Facilities

OPPTD, in partnership with the City of Los Angeles Sanitation District, the Institute for Research and Technical Assistance, and the South Coast Air Quality Management District, produced a series of reports describing the results of a test and demonstration project for water-based cleaning systems in auto repair facilities titled Parts Cleaning in Auto Repair Facilities: The Conversion to Water.

Funded under the U.S. EPA's Environmental Justice Pollution Prevention Grant Program, four types of cleaning equipment and four different water-based cleaning formulations were investigated. These included the traditional sink-on-a-drum remote reservoir configuration, an immersion system with a false sink, a spray cabinet, and an enzyme unit. Three of the formulations were alkaline cleaners and one was an enzyme. None of the formulations contained solvent additives.

Reported results indicated that water-based cleaning units and formulations were a viable alternative to mineral spirits for parts cleaning in auto repair facilities. The results are contained in three separate documents published by OPPTD: OPPTD document #613 is an executive summary, document #614 describes the project and results, and document #615 contains the laboratory analysis.

Aqueous Cleaning Case Studies Project (In Progress)

Southern California Edison (SCE) and The Institute for Research and Technical Assistance will be assisting businesses in converting to water-based systems for parts cleaning. SCE and The Institute for Research and Technical Assistance will assist these companies, from large electronic firms to transmission shops, in evaluating and comparing different water-based systems and selecting those that are best suited for each firm's operation. Case studies were prepared that compare the performance and cost of the solvent and water-based systems. The Case studies will be available in May 1999. The companies will also act as showcases so that other companies in the area, or firms that perform similar operations, can visit to ask more detailed questions about the systems and reasons for their selection.

A second element of this project was a workshop titled "The Do's and Don'ts of Water-Based

Cleaning: A Workshop for Vendors” which was held in April 1998. The workshop provided a presentation of regulations, equipment, formulations, systems, and costs.

The third project element, outreach to those facilities that need to make the conversion from highly volatile organic compounds to water, includes two seminars and exhibition fairs for automotive repair and industrial facilities. One of the events was held in July of 1998. The second took place in December 1998.

OPPTD provides support to this project through technical and regulatory consulting and will print and disseminate the final report.

Guidance for Water-Based Solvents in Auto Repair Shops and Maintenance Cleaning Facilities

OPPTD, in partnership with the Santa Barbara Air Pollution Control District and the Pollution Prevention Center, is preparing a guidance checklist for auto repair shop owners regarding what to look for and ask about before purchasing aqueous-based cleaning systems. The guidance addresses performance, operational parameters, material safety, and hazardous waste management. A report will also be written to provide a framework to both vendors and suppliers of aqueous-based cleaning units and formulations to suggest what should be included in their promotional sales literature. Funding for this project was provided by OPPTD.

Assisting Furniture Strippers in Reducing the Risk from Methylene Chloride Stripping Formulations, An Alternative to Methylene Chloride (In Progress)

This project will focus on evaluating the alternatives to methylene chloride in the furniture stripping industry. The most promising alternatives will be identified and tested in selected facilities. The feasibility of the alternatives will be documented along with a discussion of economic, health and safety, and environmental tradeoffs. Project partners include OPPTD, the National Institute of Occupational Safety and Health, South Coast Air Quality Management District, Los Angeles County Sanitation Districts, Southern California Edison, The Institute for Research and Technical Assistance, and selected furniture stripping businesses in the Los Angeles area. Funding for this project originates from the National Institute for Occupational Health and Safety and The South Coast Air Quality Management District.

Substitutes for Brake Cleaning: Minimizing the Human Health and Environmental Consequences (In Progress)

This project, being conducted by the New Partnership Foundation, (NPF) is focusing on testing and demonstrating water-based brake cleaning alternatives to replace perchloroethylene (PERC) aerosol cleaners. PERC is a suspected carcinogen and is classified as a hazardous air pollutant. Funded by U.S. EPA Region IX via the Environmental Justice Pollution Prevention Grant Program on the behalf of the Latino Community, The Institute for Research and Technical Assistance will test water-based cleaners in 10 to 15 facilities to determine the technical feasibility and cost of replacing PERC with these cleaners. The water-based cleaners selected for testing will not contain solvent

additives or other toxic components. The NPF will ensure that the community affected by PERC emissions is involved in the project as well. At the conclusion of the project, NPF will prepare and distribute a pamphlet for the Latino Community. Project partners include OPPTD, The South Coast Air Quality Management District, City of Los Angeles Bureau of Sanitation, The Institute for Research and Technical Assistance, and the Los Angeles County Sanitation Districts. The project is scheduled to be completed by July 1999.

***Cleaner Technologies Substitutes Assessment, Adhesives Use in the Furniture Industry
(In Progress)***

This project will develop and implement a Cleaner Technologies Substitutes Assessment for adhesives in the furniture and related industries. The purpose of the Cleaner Technologies Substitutes Assessment is to provide firms in the Los Angeles area, particularly small and medium-sized ones, with information on the different types of adhesives so that businesses can make informed choices based on performance, cost, and better overall protection of human health and the environment. Various types of adhesives will be compared and assessed, including methylene chloride-based, flammable solvent-based, water-based, hot-melt, and high solids adhesives. Project partners include OPPTD, California Air Resources Board, the San Francisco Bay Area Air Quality Management District, U.S. EPA Region IX, the South Coast Air Quality Management District, The Institute for Research and Technical Assistance, Los Angeles County Sanitation Districts, Southern California Edison, the Adhesives and Sealant Council, International Sleep Products Association, and the Association of Woodworking and Furniture Suppliers. Funding for this project originates from U.S. EPA Headquarters. The project is scheduled to be completed by summer 2000.

ENVIRONMENTAL TECHNOLOGY CERTIFICATION/VERIFICATION

OPPTD was authorized by Assembly Bill 2060 of 1993 to certify the performance of hazardous waste environmental technologies. The purpose of the Certification Program is to provide a comprehensive, independent review of technologies, to facilitate regulatory approval, and to promote and foster the growth of California's environmental technology industry. Certification provides an estimate of the efficacy and efficiency of the technology with regard to the hazardous wastes or chemical constituents for which it is certified. The certification also specifies the minimal operational standards that the technology is required to meet to ensure that the certified technology is managed properly and used safely. Hazardous waste environmental technologies which may be certified include, but are not limited to, hazardous waste management, site mitigation, and waste minimization/pollution prevention technologies.

OPPTD has entered into a cooperative agreement with the U.S. Environmental Protection Agency (U.S. EPA) to conduct an Environmental Technology Verification (ETV) pilot project. The purpose of this pilot project is to develop a national technology verification program for pollution prevention and waste treatment technologies. The pilot project uses the OPPTD Certification Program as the basis for developing a national model for the verification of

pollution prevention and waste treatment technologies. The pilot project uses essentially the same process as the OPPTD Certification Program to admit and evaluate technologies.

Smart Sonic Corporation, one of the first technology vendors to participate in the ETV pilot project, has developed ultrasonic aqueous cleaning systems to replace CFC-113, 1,1,1-TCA, and isopropyl alcohol solvent-based systems for removing solder paste from printed circuit board stencils. Between May and September 1998, OPPTD evaluated Smart Sonic's aqueous cleaning systems to verify cleaning efficiency, VOC and metals content, and to identify any conditions from use of the technology which may pose a significant hazard to public health and the environment. The ETV Report is expected to be available in April, 1999.

LAWRENCE LIVERMORE/OPPTD CERTIFICATION CRITERIA FOR SOLVENT ALTERNATIVES

In search of alternatives to solvents, and in support of the Technology Certification Program, OPPTD contracted with Lawrence Livermore National Laboratory (LLNL) to oversee a panel of experts from industry, research, environmental organizations, and regulatory agencies. Their goal was to recommend criteria for use by OPPTD in the evaluation of solvent alternatives.

The draft criteria, entitled "Recommendations for a State of California Certification Protocol for Alternative Cleaning Chemistries", was presented to OPPTD by the LLNL panel in January, 1998. A two-stage protocol is suggested by the recommendations. Stage A includes stringent screening criteria for candidate cleaning chemistries. This stage also includes some verification of cleaning performance and process information to be supplied by candidate cleaning vendors. Stage B criteria are in-depth analyses of the candidate cleaning chemistry. The analyses employ biological and environmental assays, database research, and toxicological modeling.

The draft protocol is being reviewed by OPPTD, U.S. EPA, industry, environmental organizations, and the public. OPPTD is considering the criteria for application in its Technology Certification Program and may adopt the criteria in early 1999.

ASSESSMENT AND OUTREACH ON ENVIRONMENTALLY PREFERABLE ALTERNATIVES FOR BUILDING MAINTENANCE CHEMICALS (In Progress)

OPPTD, Santa Clara County's Pollution Prevention Program, and managers responsible for maintaining local schools, government buildings, and business sites in Santa Clara County area are evaluating and encouraging the use of environmentally preferred chemicals for facility maintenance and janitorial work. Key project elements include:

- , assessment of the needs of the various types of facilities,
- , identification of pollution prevention alternatives,
- , development of appropriate outreach materials, including educational fliers and lists of environmentally compatible cleaning and maintenance chemicals,
- , providing training workshops and on-site assistance,
- , sharing lessons learned with other interested businesses and agencies.

This one and a half year project which started in November 1997, is assessing the specific needs of people involved with maintaining schools, government facilities, and business sites in Santa Clara County and the greater Sacramento area.

There are significant developments in alternative "green" cleaning products, as well as efficient mixing and application systems. However, knowledge about these pollution prevention opportunities is not yet widespread. Lack of knowledge about pollution prevention opportunities in building maintenance is a key reason why better choices are not used more often. Based on prior experience with other industry pollution prevention programs, the OPPTD project team believes that the combination of general education and hands-on training of this project will increase the use of environmentally-preferred facility maintenance products.

The Department of General Services has agreed to attempt to incorporate the recommendations of this project.

CHAPTER FOUR: DEVELOPING LOCAL POLLUTION PREVENTION PROGRAMS

Since 1986, OPPTD (then known as the Alternative Technology Section) has made one of its top priorities the support of local government programs that promote source reduction. The initial project funded by OPPTD that demonstrated the potential of local government source reduction programs was Ventura County's technical assistance program. This program culminated in OPPTD's publication of Hazardous Waste Reduction Guidelines for Environmental Health Programs in 1988. Ventura's impressive results illustrated that local government can directly promote source reduction without hindering established hazardous waste regulatory efforts. Ventura County's information was shared throughout the state and nation and served as a model and provided the motivation for other local governments to implement a variety of source reduction programs.

A key element to initiating, promoting, and implementing local source reduction programs is making sufficient technical information available to the different audiences in an area. Local governments generally do not have the time or resources to research, develop, and print their own materials, yet they are very effective in reaching and teaching generators about source reduction through their inspection programs and other activities. Thus, supplying source reduction information to local government programs is crucial.

OPPTD supports local government source reduction programs through the development and distribution of relevant pollution prevention information. These technical resources include industry-specific waste audit studies, fact sheets, assessment checklists, and specific source reduction strategies and technology reports for a variety of industries. OPPTD also serves as informational liaison between these programs and keeps each group informed about what the others are doing.

Finally, OPPTD has dedicated staff to work closely with all of the local government source reduction programs through participation at local committee meetings, the California Consortium of Pollution Prevention Committees, and the Western Regional Pollution Prevention Network, a new U.S. EPA Region IX-funded program.

LOCAL GOVERNMENT POLLUTION PREVENTION COMMITTEES

California's local government pollution prevention programs have held their ground during a decade of governmental cutbacks and downsizing. The continuing success of the local government programs is facilitated by a network of regional committees.

These committees include representatives from local air, land, and water regulatory and non-regulatory agencies that meet regularly to share pollution prevention information, compliance insights, and regulatory updates. This multimedia, multi-agency network promotes and implements a variety of innovative strategies, programs and projects for businesses, the public, educational institutions, and even their own agencies. The committees also serve as a conduit for sharing information.

The activities of the regional pollution prevention committees listed below are coordinated through the California Consortium of Pollution Prevention Committees, which is made up of the chairpersons of the regional committees. The California Consortium of Pollution Prevention Committees meets quarterly to discuss the activities of the regional groups and serve as a unified point of contact between local pollution prevention programs, DTSC, and U.S. EPA Region IX. The California Consortium of Pollution Prevention Committees and OPPTD are also actively working with the Western Regional Pollution Prevention Network, a new U.S. EPA- funded program, to share information between U.S. EPA Region IX pollution prevention programs.

OPPTD staff attend approximately six meetings per year per committee, and provide the printing and mailing of meeting agendas and minutes. Additionally, OPPTD provides other support, such as assisting with writing grants for the North Coast Pollution Prevention Committee, funding, producing and duplicating a pollution prevention videotape for the Central Valley Pollution Prevention Committee, and printing and mailing a promotional brochure for the Bay Area Hazardous Waste Reduction Committee.

Southern California Pollution Prevention Committee

The Southern California Pollution Prevention Committee consists mainly of representatives from the greater Los Angeles area. This committee meets every other month to discuss member activities, group projects, and new and amended regulations. Committee members have also been actively involved with multimedia issues arising from the recent phase-out of chlorinated solvents and use of aqueous-based cleaners in cleaning applications and in the development of education materials and outreach efforts to implement these changes.

The Tri-County Pollution Prevention Committee

This newest addition to the cadre of local government pollution prevention committees was created by former members of the Southern California Pollution Prevention Committee from Ventura and Santa Barbara Counties, and expanded to include San Luis Obispo County. A major accomplishment of the Tri-County Pollution Prevention Committee was the interaction and sharing of information both within a particular county and at the regional level, thus opening new levels of communication and awareness between agencies.

Central Valley Pollution Prevention Committee

The Central Valley Pollution Prevention Committee was established in June 1990. This group has a unique opportunity to guide the development of pollution prevention programs within some of California's more rural jurisdictions. Participants include representatives from the cities and counties of the Central Valley from Fresno to Sacramento, as well as communities from the Sierra Nevada Mountains. The Central Valley Pollution Prevention Committee produced the video entitled "Urban Water Pollution Prevention."

Sacramento Area Pollution Prevention Committee

The Sacramento Area Pollution Prevention Committee is coordinated through Sacramento County's Business Environmental Resource Center. The Business Environmental Resource Center is a joint project of the Sacramento Metropolitan Air Quality Management District, Sacramento County Public Works Agency, and the Sacramento County Environmental Management Department. The Business Environmental Resource Center's mission is to help businesses and environmental agencies develop and implement innovative, proactive, and cost-effective solutions to pollution problems. The Business Environmental Resource Center also helps agencies streamline and consolidate the permitting process and acts as a mediator between the business community and agencies.

Membership in The Sacramento Area Pollution Prevention Committee consists of environmental staff from the city and county of Sacramento as well as cities within Sacramento County. This committee's major goal is to help businesses establish and implement cost-effective compliance and pollution prevention programs. Its activities include participation in National Pollution Prevention Week and the presentation of National Pollution Prevention Week awards to local businesses. The Sacramento Area Prevention Committee produced a report on Hospital Recycling and is active in the development and implementation of incentive-based pollution prevention programs to educate businesses such as carpet cleaners and the hospital industry. Sacramento Area Pollution Prevention Committee members are also active participants in California Consortium of Pollution Prevention Committees and the Western Regional Pollution Prevention Network.

Bay Area Hazardous Waste Reduction Committee

The Bay Area Hazardous Waste Reduction Committee was formed in 1989. Participants include representatives from the San Francisco Bay area cities and counties, as well as the East Bay Municipal Utilities District, and the Bay Area Air Quality Management District.

The efforts of The Bay Area Hazardous Waste Reduction Committee were supported by an OPPTD grant that created opportunities for government and industries to exchange information, coordinate local government activities, disseminate information, and broaden membership. Although grant funding ended, The Bay Area Hazardous Waste Reduction Committee members continue to work on group projects, and have voluntarily kept the Committee's work going by providing meeting sites, printing, the mailing of agendas and meeting minutes. Projects include industry-specific pollution prevention tours and a membership outreach brochure.

North Coast Pollution Prevention Committee

The North Coast Pollution Prevention Committee was formed in 1993 through a grant from OPPTD to the Humboldt County Environmental Health Agency. The North Coast Pollution Prevention Committee serves the north coast region of the state, where the major industries are lumber, fisheries, and tourism. Members include representatives from the city and county environmental health departments from Del Norte, Humboldt, Lake, Mendocino, and Sonoma Counties, Humboldt State University, the North Coast Regional Water Quality Control, and the North Coast Unified Air Quality Management District.

While this Committee is a small one, it has become a tight-knit and effective cadre of pollution prevention and compliance specialists working closely with the many small businesses in the area. The North Coast Pollution Prevention Committee presents pollution prevention/compliance workshops for vehicle maintenance facilities, and has developed a vehicle wash rack pollution prevention fact sheet.

REGIONAL POLLUTION PREVENTION GROUPS

Targeted Opportunities to Prevent Pollution in San Joaquin County (TOPPS):

Targeted Opportunities to Prevent Pollution in San Joaquin County's mission is to inform, educate, and support business, industry, and agriculture in San Joaquin County in their efforts to better the environment and improve financial performance by minimizing pollution to air, land, and water. Started in 1992 as a pilot project, this effort now functions independently of DTSC/OPPTD. The program has been successful in raising the pollution prevention awareness of the business community. OPPTD participates with TOPPS at bimonthly meetings, the annual conference, Earth Day events,

National Pollution Prevention Week and through their Awards for Environmental Excellence Program.

San Francisco Bay Area Green Business Program (Green Business Program):

The San Francisco Bay Area Green Business Program's mission is to encourage the use of environmentally sound business practices through positive incentives and assistance. The program is a voluntary cooperative effort to assist small businesses such as auto shops, printers, and wineries. The goals of the program are to increase small businesses' understanding of the regulatory concerns of state and local agencies, to bring small businesses into full compliance with environmental regulation, and to persuade the businesses to implement pollution prevention and resource conservation practices. Businesses that are in full compliance receive certificates. Businesses that go further and take steps to prevent pollution and conserve resources are awarded the use of the program logo which may be used in promotion and advertising. DTSC provides administrative and technical support to the program and assists in its coordination. The Green Business Program is supported through funding assistance from the U.S. EPA Resource Conservation and Recovery Act (RCRA) grant.

After developing the Green Business Program in 1994 and 1995, pilot programs for auto repair shops were started in Alameda and Napa counties in 1996. Contra Costa County began its first Green Business Program for auto shops in April 1998. Alameda began a pilot Green Business Program for printers in 1997, as will Contra Costa in 1999.

Green Business programs for wineries and wine grape vineyards are being developed in Napa and Sonoma counties. Santa Clara County is beginning the program, using generic Green Business Program standards. The City of Morgan Hill in Santa Clara County is currently offering this approach to businesses that volunteer to participate.

DTSC is currently working on the vineyard standard, and in 1999 will assist in developing standards for dry cleaners and hotel/hospitality. Standards will also be developed in the future for the construction industry and small manufacturing.

A data base to track the progress of the Green Business Program and participating businesses was developed. Contacting participating businesses and inputting data will be an ongoing task for the years to come.

WESTERN REGIONAL POLLUTION PREVENTION NETWORK

OPPTD was instrumental in the development of the Western Regional Pollution Prevention Network (WRPPN). The Western Regional Pollution Prevention Network is a network of organizations and on-line tools established to assist pollution prevention service providers in locating other providers, vendors, consultants, partnering opportunities, useful documents, background information, environmental management information, hypertext links to World Wide Web sites, and more. OPPTD staff serve on the advisory committee that directs the activities of the Network. The basic premise of the Network is that such a network of pollution prevention service provider organizations in the western states (Arizona, California, Hawaii, and Nevada) can share information and thereby leverage their resources. This approach builds a strong and decentralized alliance of organizations who share information. By leveraging resources, in this case pollution prevention program elements already operating in limited capacity, it is possible to keep costs to a minimum and make the system sustainable. Ultimately, the goal of this network is to eliminate duplication of efforts, share scarce resources and enable pollution prevention service providers to focus more of their resources and time on providing assistance to the communities they serve. The Western Regional Pollution Prevention Network is partially funded through a U.S. EPA Pollution Prevention Incentives to States Grant, with matching funding provided by member state organizations.

Communications in the Western Regional Pollution Prevention Network are facilitated by electronic media such as e-mail and list-serve information systems, augmented by telephone and fax contact avenues. Network activities are coordinated by an Advisory Committee, which is comprised of representative pollution prevention organizations from each of the participating states, in collaboration with the project coordinator and institutions providing the electronic information infrastructure.

The World Wide Web site for Western Regional Pollution Prevention Network and the associated pollution prevention list-serve are interactive information exchange network tools designed to provide easy access to the latest on pollution prevention information. The Uniform Resource Locator (URL) is <http://www.westP2net.org>.

The interactive list-serve allows the western regional states to communicate with pollution prevention service providers throughout U.S. EPA Region IX for quick responses to technical pollution prevention questions.

The Western Regional Pollution Prevention Network also organizes and facilitates two pollution prevention conferences for pollution prevention service providers within U.S. EPA Region IX. The conferences allow for information sharing and joint project development that address the special needs of the western region.

FEDERAL GRANT PROJECT, POLLUTION PREVENTION INCENTIVES TO STATES GRANT PROGRAM:

OPPTD has been very successful at developing, submitting and obtaining funding for pollution prevention projects through U.S. EPA's competitive Pollution Prevention Incentives to States (PPIS) Grants Program. The majority of the funding has been used to support OPPTD's commitment to work with and provide services to local government programs. Overviews of these projects are presented below.

California Local Government Pollution Prevention Support

Project: This 32 month project provided support and encouragement of local government pollution prevention activities through three interrelated activities. These activities are summarized below.

Local Government Pollution Prevention Program Development and Support: OPPTD participated in over 72 meetings of local government pollution prevention committees and organizations. Staff provided state regulatory and legislative updates and copies of OPPTD publications at these meetings and through the publication list and telephone requests. OPPTD continues to serve as DTSC's pollution prevention liaison between the local government committees, California Air Resources Board, Santa Barbara and San Francisco Air Pollution Control Districts, South Coast Air Quality Management District, and Central Valley and San Francisco Regional Water Quality Control Boards.

Pollution Prevention Week: OPPTD prepared support materials for the 1995 through 1998 Pollution Prevention Week events, obtained pollution prevention proclamations from Governor Wilson, and distributed copies to local and state agencies. OPPTD assisted local government agencies in a variety of Pollution Prevention Week activities throughout the state during 1995 and 1996. In 1996, 1997, and 1998, OPPTD worked with the East Bay Municipal Utility District graphics artist to design the Pollution Prevention Week poster. OPPTD coordinated the printing and distribution of approximately 5,000 copies of the poster each year to local, state, and federal agencies as well as to individuals throughout the state and nation. OPPTD encouraged local governments, trade associations, and environmental groups to sponsor National Pollution Prevention Week activities.

Regional Pollution Prevention Information Clearinghouse: There currently exist over 100 established pollution prevention service providers throughout U.S. EPA Region IX. In order to support these providers, and in coordination with the newly established Western Regional Pollution Prevention Network, OPPTD submitted a grant proposal to U.S. EPA Region IX to hire three retired industrial professionals to staff the Pollution Prevention Information

Clearinghouse. In October of 1997 a grant was awarded OPPTD to:

- , provide a one-stop-shop for pollution prevention information,
- , provide information research capabilities for complex pollution prevention questions,
- , provide electronic and hard copy responses to requests for information,
- , network with other pollution prevention information clearinghouses, both in Region IX and nationally,
- , provide the experience and expertise of retired professionals with knowledge of industrial processes and manufacturing.

Retired Professionals Program

The OPPTD Retired Professionals Program which is partially funded by U.S. EPA provides technical pollution prevention information and other assistance to the Western Regional Pollution Prevention Network through a toll-free telephone line, (800) 700-5854, and through electronic links such as the Western Regional Pollution Prevention Network list-serve and the Web site.

Retired professional programs have been used by many other state pollution prevention programs and have proven effective in delivering technical pollution prevention information. Retired professionals experienced in manufacturing processes draw on past knowledge to interpret and respond to complex requests for technical information. Additionally, retired professionals offer the benefit of acting as mentors to junior staff members with less experience.

Catalog of Pollution Prevention Resources

OPPTD has a proven track record for developing and providing high quality, user-friendly pollution prevention information for industry and government agencies within California. In addition to the pollution prevention documents developed in-house, OPPTD has cataloged over 2,000 pollution prevention documents and articles from all over the world. OPPTD will make this information available to all pollution prevention service providers within U.S. EPA Region IX through the retired professionals program.

ANNUAL LOCAL GOVERNMENT POLLUTION PREVENTION CONFERENCE

OPPTD has been a major sponsor of the Annual Local Government Pollution Prevention Conferences for regional Committee representatives, state agency staff, and U.S. EPA. OPPTD helps develop the agenda, provides speakers, and conducts presentations for the conferences. The goal of the conferences is to further communication and statewide consistency in the application of pollution prevention strategies. California Consortium of Pollution Prevention Committees members determine the conference agenda and session topics and assist in the planning.

The conference provides local representatives with opportunities to present and discuss ways to implement pollution prevention more effectively. It also allows them to interact with staff from state agencies and U.S. EPA. To date, seven conferences have been held with OPPTD and U.S. EPA Region IX support. The first two focused on how to institutionalize pollution prevention training programs, and on educational and technical outreach for small-quantity generators and tools for assessing program effectiveness. At later conferences, the results and accomplishments of each of the four regional committees were presented.

CHAPTER FIVE: INTEGRATION OF POLLUTION PREVENTION INTO THE DTSC REGULATORY PROGRAMS

While pollution prevention has been a part of DTSC's program since 1985, most of OPPTD's pollution prevention activities have focused upon compliance with the planning and reporting requirements of SB 14, augmenting the pollution prevention efforts of generators with OPPTD's research, and disseminating information on alternatives to waste generation and disposal. Most of OPPTD's efforts have been focused on voluntary approaches.

Pollution prevention is commonly promoted via voluntary means. Economic benefits and other incentives attract businesses to pursue pollution prevention. Programs such as SB 14 combined with other education and outreach efforts have been presumed to provide sufficient incentives for businesses to adopt pollution prevention. However, pollution prevention professionals argue about which approach is better, voluntary technical assistance programs or "integration" of pollution prevention into traditional regulatory programs.

DTSC believes that pollution prevention should be promoted via all avenues, both voluntary and regulatory. While it is essential to have technical assistance programs, it is also important to convey, through facility inspection and hazardous waste permit programs, the need for businesses to consider pollution prevention as the best route to compliance and environmental improvement. One study, conducted by U.S. EPA, indicates that facilities have a heightened interest in pollution prevention following an enforcement contact. Additionally, regulatory programs can help build the market for the services provided by pollution prevention technical assistance groups and businesses.

As a fundamental part of OPPTD's efforts to keep its regulatory approach effective and relevant, OPPTD and the Hazardous Waste Management Program have been working together to establish a comprehensive approach to integrating pollution prevention into regulatory programs such as permitting, inspections, and enforcement. Because pollution prevention, or source reduction as specified in California statute, is a generator issue, most of the DTSC's efforts to integrate pollution prevention into regulatory approaches is occurring within the Statewide Regulatory Program Division's activities. The Statewide Regulatory Program Division is charged with developing, overseeing, and evaluating local government hazardous waste inspection agencies. These state-certified "certified unified program agencies" (CUPAs), are responsible for inspecting generator and tiered permitting facilities in California. Specific activities are described below:

What is a CUPA?

Senate Bill 1082 of 1993 established a unified hazardous waste and hazardous materials management regulatory program (Unified Program). The Unified Program consolidates, coordinates, and makes consistent portions of the following six existing programs:

- C hazardous waste generators and hazardous waste onsite treatment,**
- C underground storage tanks,**
- C hazardous materials release response plans and inventories,**
- C accidental release prevention program,**
- C aboveground storage tanks (spill prevention control and countermeasure plan only),
and**
- C uniform fire code hazardous material management plans and inventories.**

These programs are unified within local agencies across California. In some counties, a single agency has jurisdiction; in others, the regulatory authority is shared between various city and county departments. These local agencies, known as certified unified program agencies (CUPAs), must be certified by the Cal/EPA secretary to be authorized to conduct these programs.

The Department of Toxic Substances Control (DTSC) is the lead agency within the Cal/EPA for implementation of this program. The DTSC works with the state Water Resources Control Board, the Office of Emergency Services, and other appropriate agencies to ensure consistent application of state law across California.

The DTSC's Office of Pollution Prevention and Technology Development, having a long history of working with and supporting local pollution prevention programs, saw the implementation of this program as a prime opportunity to better incorporate pollution prevention approaches into California's hazardous waste regulatory program.

TRAINING

Half-day pollution prevention classes for CUPA inspectors (primarily stressing SB 14) were given to 45 regulatory agencies, and 3 “other” entities (i.e., business assistance programs, community group representatives). Two hundred twenty eight persons received this training. Agencies that have received the training are:

2/22/96	Alameda County Environmental Health, Fremont Fire, Hayward Fire, DTSC, San Leandro Fire, Oakland Fire, Newark Fire, Livermore Fire, Union City, Alameda Fire
3/7/96	San Joaquin County, El Dorado County, Stanislaus County, Calaveras County
7/10/96	San Bernardino Fire, Riverside Fire
11/6/96	Sonoma County Environmental Health, Santa Rosa Fire, Healdsburg/Sebastopol CUPA, Santa Rosa Industrial Waste, Petaluma Fire, Healdsburg Fire
12/5/96	Santa Fe Springs Fire, Fullerton Fire, Santa Monica Industrial Waste, Orange County Fire, DTSC, The Institute for Research and Technical Assistance, Long Beach Health, Costa Mesa Fire
12/11/96	Orange County Health Care Agency
2/5/97	Ventura Fire, Santa Barbara Fire, Ventura County, City of Oxnard
3/5/97	Contra Costa County Environmental Health, Solano County Environmental Management
3/18/97	San Diego County Environmental Health, Encina Wastewater Authority, City of San Diego, Environmental Health Coalition
5/7/97	El Segundo Fire, LA Fire, LA County, CACT/REBRAC, Orange County Fire, City of Vernon, Torrance Fire

In addition, two-to-three hour SB 14 classes were given in conjunction with DTSC’s “advanced CUPA training” given in Sacramento, Fresno, and Los Angeles in the spring of 1998. Approximately 250 inspectors from a variety of CUPAs attended these sessions.

INTEGRATION OF POLLUTION PREVENTION INTO THE CUPA PROGRAM

The regulations governing the CUPA program (within Title 27) contain two references to pollution prevention. The regulations include a requirement for CUPAs to check SB 14 source reduction plans in hazardous waste generator/tiered permitting inspections. This consists of determining whether a facility is subject to SB 14, and a short “review” of documents during the inspection. CUPA inspectors are not expected to perform complete technical reviews as conducted by OPPTD staff.

Their role is to ensure that the facility has prepared the appropriate documents. Facilities that need help complying with the requirement may receive guidance from the local agency, or may be referred to OPPTD for compliance and technical assistance.

The CUPA program also contains provisions that allow for additional nonregulatory pollution prevention elements, such as technical assistance, distribution of publications, workshops, etc. OPPTD supports these activities as resources allow.

Integrating pollution prevention into CUPA performance standards remains as an important element of this effort. It is OPPTD's view that better-managed CUPAs will be leaders in providing the facilities they regulate with the pollution prevention information that will enable them to make process improvements that increase efficiency and reduce waste, rather than just managing waste. This will lead to increased compliance at reduced cost.

ORANGE COUNTY PROJECT

OPPTD has been working jointly with the Orange County Health Care Agency (a CUPA) for several years. Facilities out of compliance with SB 14 were identified during tiered hazardous waste permit inspections and referred to OPPTD for compliance and technical assistance. This project has provided OPPTD with a unique opportunity to work with businesses prior to completion of planning documents.

Of the 51 facilities referred by Orange County to OPPTD:

, 27% (14) were not subject to SB 14 (facility no longer operating, had not characterized aqueous waste stream properly, misfiled for tiered permitting etc.)

Of the remaining (37) captured facilities:

, 43 percent were small businesses;

, 87 percent were metal platers/finishers or printed circuit board manufacturers (most of the small businesses were also within this group); and

, the remaining facilities were a paint manufacturer, a plastics manufacturer, a laboratory, a neon sign manufacturer, a photo processor, and a paper manufacturer.

This project suggests that integrating SB 14 into CUPA inspection programs can be an avenue to providing pollution prevention information to small businesses, especially for small businesses, such as those in the metal plating and finishing industries. Small businesses, generally without the resources to maintain full-time environmental staff, may find much benefit from the structured process review contained in SB 14.

A second phase of the project activities provided advanced technical pollution prevention training to Orange County hazardous waste inspectors. The project will compare the effect of a “pollution prevention-oriented” inspection versus a “traditional” inspection where inspectors only focus on compliance with waste management requirements.

To assist in evaluating the project, faculty from California State University, Sacramento formulated and administered surveys to determine the effects of these interactions with generators. Initial results concerning the first phase of the project, where SB 14 violators were referred to OPPTD for assistance, are quite interesting. In looking at the approximately forty facilities that received regulatory and technical assistance from OPPTD, the most obvious benefits to facilities from these interactions appear to be regulatory. 82 percent of facilities that interacted with regulatory agency personnel concerning source reduction planning received “other regulatory benefits” (some facilities listed more than one benefit). These benefits included:

- , reduced or eliminated tiered permitting status (27 percent),**
- , reduced waste generation to below SB 14 threshold (54 percent), and**
- , reduced generator status from large to small quantity generator (27 percent).**

Other interesting results include:

- , 76 percent of facilities that completed a pollution prevention planning process stated that useful information was generated;**
- , of those that generated useful information from planning, 92 percent indicated they identified source reduction opportunities;**
- , of those that identified source reduction opportunities, 82 percent plan to implement some of the source reduction opportunities within the next**

year;

, of those indicating they would be implementing source reduction opportunities, 88 percent predicted cost savings due to implementation;

, generators were split about the importance of consultants as sources of information about alternative practices or technologies, with 44 percent declaring such sources as “important”, and 44 percent citing them as “not important”; and

, government employees and publications ranked highly as sources of information about alternatives (39 percent and 44 percent, respectively).

The second phase of the project is still underway. At this writing, Orange County inspectors have received industry-specific training in pollution prevention; the administrative changes to facilitate pollution prevention interactions during inspections are currently being implemented. Generator evaluations assessing the impact of pollution prevention within these inspections will be conducted in 1999.

These studies will help OPPTD determine whether or not soliciting referrals from additional CUPAs is an effective mechanism for promoting pollution prevention.

SUPPLEMENTAL ENVIRONMENTAL PROJECTS

Enforcement settlements provide a unique opportunity to further pollution prevention through agreements referred to as “Supplemental Environmental Projects”. Pollution prevention Supplemental Environmental Projects involve a negotiated settlement to conduct pollution prevention projects as credits towards a partial reduction of fines or penalties. These Supplemental Environmental Projects allow DTSC to enforce conditions beyond mere compliance with the existing laws and regulations. However, key to these agreements is the need for a nexus between the violation and the proposed environmental project. Supplemental Environmental Projects are not always appropriate nor are there opportunities for every case. Furthermore, they are generally more resource intensive and require ongoing follow up.

OPPTD has coordinated this effort with the Hazardous Waste Management Program and has been involved in several Supplemental Environmental Projects during this reporting period. In the spring of 1998, OPPTD provided assistance in identifying appropriate Supplemental Environmental

Projects for a large printing facility. An additional request was received in the summer of 1998 regarding an educational laboratory. These projects are currently underway.

POLLUTION PREVENTION IN PERMITS

A pollution prevention “regulatory integration” workshop was held in June of 1998. One outcome of this workshop was the development of a joint pilot project between the OPPTD and Permitting Division (PD) programs. During the workshop, it became apparent that the two programs should coordinate activities more effectively. A pilot project was developed that would provide this coordination. The goal of the project is to use the hazardous waste treatment, storage and disposal permitting process to:

- 1) raise pollution prevention awareness for both permit writers and facility staff
- 2) integrate pollution prevention and regulatory issues
- 3) effect increased implementation of pollution prevention strategies

OPPTD and PD hope to demonstrate the relationship of the permitting and source reduction planning processes and assess its potential to effect environmental improvements. In the pilot, facilities applying for permit renewal that are subject to SB 14 will be selected for a concurrent pollution prevention evaluation.

OPPTD staff will review SB 14 documents from facilities applying for a permit renewal. Historical and new (9/1/99) SB 14 documents will be evaluated to determine source reduction progress over time, and the relationship of the facility’s source reduction planning efforts to its permitting issues. Then, OPPTD and PD staff will meet to discuss these relationships. Specific areas for discussion include questions such as:

- * are the major waste streams identified in source reduction documents related to need for permit?
- * do the selected source reduction measures identified in the SB 14 plan potentially obviate the need for a permit, or specific permit elements?
- * are there rejected source reduction measures identified in the plan that could have bearings on permit issues?
- * is OPPTD aware of other (not in the SB 14 plan) source reduction measures that could address permit issues?

This information will be used in the preapplication meeting with the applicant to discuss the possibility of enhanced pollution prevention implementation.

CHAPTER SIX: NATIONAL AND INTERNATIONAL POLLUTION PREVENTION EFFORTS

OPPTD has been a leader in pollution prevention outside of California. Many pollution prevention projects and ideas that have been implemented in California have been replicated by other programs throughout the nation. OPPTD has long recognized the importance of sharing program successes and failures with others struggling to implement pollution prevention programs. Information sharing, as a result of working with other national and international organizations has been extremely valuable for OPPTD in that it provides fresh, new ideas for future programs and helps avoid pitfalls and duplication of effort which ultimately results in cost savings to OPPTD's program.

Additionally, participation in national organizations has allowed OPPTD the opportunity to provide input into proposed national policy and to learn of the latest developments in the field of pollution prevention. Listed below are some of the efforts and programs that OPPTD actively participates in both on the national and international level.

FORUM ON STATE AND TRIBAL TOXICS ACTIONS (FOSTTA) POLLUTION PREVENTION COMMITTEE

Under the auspices of the Forum on State and Tribal Toxics Actions (FOSTTA), U.S. EPA has convened a panel of high level state and tribal officials to provide input and advice on various federal pollution prevention efforts. Since March 1997, OPPTD has been participating on this FOSTTA workgroup, with representatives from North Carolina, Indiana, Texas, Pennsylvania, Wisconsin, Oregon, and Minnesota, as well as several native American tribes. The group also includes representatives from U.S. EPA Regions V and IX. The meetings tend to be more discussion oriented, with presentations by U.S. EPA or other invited guests, followed by questions, comments, and recommendations from the advisory group members.

One of the key focus areas for this group has been the issue of pollution prevention measurement. Driving U.S. EPA's interest in measurement is the federal Government Performance Review Act (GPRA) which mandates that all federal agencies review their performance in terms of "outcomes", as opposed to measuring activities, or outputs. The group has provided U.S. EPA with comments on the concept of including pollution prevention as one of the Agency's strategic outcomes, similar to measurably cleaner air and cleaner water. This issue will be pursued in future meetings.

Another major topic at the spring 1998 meeting was a discussion of the federal Pollution Prevention Incentives to States grant program. U.S. EPA is evaluating this program and considering changes for improvement. The Pollution Prevention Incentives to States grant program has also been

the subject of discussions related to the new Performance Partnership Grants (PPG) that U.S. EPA is using to try to refocus state efforts on “outcomes” rather than “outputs.”

Other topics that have been considered at these meetings include, “green” product labeling, community-based environmental projects, the reauthorization of the Pollution Prevention Act of 1990, coordination of pollution prevention with inspection and enforcement efforts, and TRI reporting as a measurement tool. The group has also received briefings on some of U.S. EPA’s pilot projects under Design for the Environment (DfE), the Common Sense Initiative (CSI), Project XL, the Environmental Leadership Program (ELP) and the Persistent, Toxic and Bio-accumulative Initiative (PBT).

THE NATIONAL POLLUTION PREVENTION ROUNDTABLE

For the past 13 years, staff from OPPTD have actively participated in the National Pollution Prevention Roundtable (NPPR), the largest membership organization in the United States devoted solely to pollution prevention. The National Pollution Prevention Roundtable is a national forum promoting the development, implementation, and evaluation of efforts to avoid, eliminate, or reduce pollution at the source. The National Pollution Prevention Roundtable hosts bi-annual conferences, which provide members a forum for exchanging the latest in pollution prevention research, policy, funding opportunities, and technical expertise.

Staff from OPPTD served on the start-up board of directors for the National Pollution Prevention Roundtable and were instrumental in establishing the National Pollution Prevention Roundtable as a national nonprofit (501(c)(3)) organization. OPPTD staff have served (and currently serve) on the board of directors for the National Pollution Prevention Roundtable, have chaired committees, and have served on working groups evaluating integration of pollution prevention into regulatory programs.

OPPTD staff are reviewing the reauthorization of the federal Pollution Prevention Act in National Pollution Prevention Round Table work groups, and are providing and sharing information nationally via Internet list serves.

FACILITY POLLUTION PREVENTION PLANNING REQUIREMENTS

OPPTD staff served as co-chair for the National Pollution Prevention Roundtable's Facility Pollution Prevention Planning Workgroup (Workgroup) for five years. During that tenure, the Workgroup prepared a "white paper", published by the National Pollution Prevention Roundtable, titled "Facility Pollution Prevention Planning Requirements: An Overview of State Program Evaluations." The culmination of twelve months of collaboration by Workgroup members, this report is the first study to document facility planning program results on a national level.

The paper focused on state program evaluations conducted by Massachusetts, Minnesota, New Jersey, Oregon, Texas, California, and Washington. This review concluded that the pollution prevention planning process required by the programs (such as California's Hazardous Waste Source Reduction and Management Review Act) effectively identified and promoted pollution prevention, facilitated improved environmental management, reduced waste generation, and resulted in cost savings.

UNITED STATES/MEXICO BORDER XXI PROGRAM: POLLUTION PREVENTION PROJECTS

The United States/Mexico Border XXI Program (Border XXI) is an innovative binational effort. US and Mexican state and federal entities responsible for the shared border environment work cooperatively toward sustainable development through protection of human health and the environment and proper management of natural resources in both countries.

The principal goal of Border XXI is to promote sustainable development in the region by seeking a balance between social and economic factors and the protection of the environment in border communities and natural areas.

Agenda 21, a series of international environmental objectives, which emerged from the United Nations Conference on Environmental Development (UNCED), held in 1992 in Rio de Janeiro, Brazil, provided guiding principles for sustainable development on a global basis. Agenda 21 encourages citizens and governments at various levels to define specific programs that support sustainable development as it applies to their own communities. In accordance with these concepts, Border XXI promotes sustainable development in the border region which meets the needs of the present without compromising the ability of future generations to meet their own needs.

The central strategy of Border XXI consists of three components: public involvement, decentralization of environmental management through state and local capacity building, and improved communication and cooperation among federal, state, and local government agencies.

OPPTD's staff work with DTSC's Border Coordinator, and has taken the lead on pollution prevention projects. OPPTD is a member of the United States/Mexico Pollution Prevention Workgroup and participates in monthly conference calls and meetings.

OPPTD has developed and presented three pollution prevention workshops in the border area. The first workshop was an introduction to pollution prevention and was presented to Mexican government officials in March 1997, in Tijuana, Baja California. Workshop attendees included Mexican government officials (federal, state and local), academia, and nonprofit organizations. The second workshop in May 1997, in San Diego, was developed for the local manufacturers including Maquiladoras, and focused on the electronics industry. The third workshop, co-sponsored by the Dirección General de Ecología del Estado de Baja California (Baja California Department of Ecology), was held in Tijuana on May 12, 1998. This workshop trained over 125 people in source reduction techniques for the electronics industry.

OPPTD has also participated in meetings with Mexican federal and state officials to develop ideas for pollution prevention projects along the U.S./Mexico Border.

APPENDIX A

THE MISSION OF THE POLLUTION PREVENTION BRANCH, OFFICE OF POLLUTION PREVENTION AND TECHNOLOGY DEVELOPMENT

To Promote Pollution Prevention by Providing State Leadership, Guidance, and Assistance to Industry, Local Government and Other Environmental Regulatory Agencies.

OBJECTIVES

To achieve measurable reductions in the generation and/or toxicity of toxic pollutants produced in California through source reduction.

To establish effective networks for communicating and promoting pollution prevention information.

To engage state and local inspectors as agents of change in promoting pollution prevention.

To continue to develop both focused and broad-based materials (fact sheets, videos, technical reports) that support pollution prevention efforts.

To expand current pollution prevention efforts to include other environmental regulatory agencies to achieve a multi-media approach to pollution prevention.

To provide regulatory and technical assistance to businesses attempting to implement pollution prevention programs.

To provide support to local pollution prevention programs.

APPENDIX B

PUBLICATIONS LIST

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APPENDIX C

OPPTD PRESENTATIONS

POLLUTION PREVENTION TRAINING PRESENTATIONS

January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
Fullerton College / Business Environmental Assistance Center Pollution Prevention Class; SB 14 Training	7 ConfCall	Sacramento/ Anaheim	12 Jan 1996	Pat Bennett
California's First Household Hazardous Waste Management Conference: "Pollution Prevention --- What Is It?"	180	Asilomar Conf.Center	7 Feb 1996	Robert Ludwig
Fullerton College / Business Environmental Assistance Center Pollution Prevention Class; SB 14 Training	8	Anaheim	14 Feb 1996	Pat Bennett
SB 14 Training for Hazardous Waste Inspectors in a Certified Unified Program Agency	24	Alameda Co. Env. Health	22 Feb 1996	Kathryn Barwick Fox
SB 14 Training for Hazardous Waste Inspectors in a Certified Unified Program Agency	10	San Joaquin Co.Env.Hlth.	7 Mar 1996	Kathryn Barwick Fox
SB 14 Training for Hazardous Waste Inspectors in a Certified Unified Program Agency	25	San Diego Co.Env.Hlth.	13 Mar 1996	Kathryn Barwick Fox
SB 14 Program presentation to U.S. EPA Region IX staff	16	U.S. EPA; San Francisco	18 Mar 1996	Kathryn Barwick Fox
SB 14 Program presentation to LUPIC (CUPA Committee)	20	Union Bldg. Sacramento	21 Mar 1996	Kathryn Barwick Fox
Mothers of East Los Angeles Board of Directors	10	East Los Angeles	9 April 1996	David Weightman

POLLUTION PREVENTION TRAINING PRESENTATIONS

January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
Industrial Competitiveness Network Conference, University of California at Los Angeles: Source reduction presentation during pollution prevention session of conference	30 at session; 300 at confrnce	Los Angeles	2 April 1996	Stan Lau
Earth Day 1996, California State University at Hayward: DTSC OPPTD booth during Earth Day celebration	40 est.	Hayward	19 April 1996	Melissa Salinas Stan Lau
Fullerton College: Business Environmental Assistance Center Pollution Prevention Class; SB 14 Training	6	Anaheim	2 May 1996	Pat Bennett
Planning & Conservation League and Peninsula Conservation Center Foundation; SB 14 Orientation Workshop	4	Sacramento	19 June 1996	David Weightman
SB 14 Community Right-To-Know Project Orientation Session #2: Communities for a Better Environment, Quality Community Alliance, Mothers of East Los Angeles	10	Long Beach	7 July 1996	David Weightman
OPPTD Activity Update to Bay Area Hazardous Waste Reduction Committee Meeting	15	Oakland	14 Aug 1996	Robert Ludwig
California Water Environment Association (CWEA) 1996 Northern Regional Training Conference Session "Reducing Wastewater in the Metal Plating Industry"	15	Redding	20 Sept 1996	Pat Bennett
Kaiser Hospital Safety Officer's Meeting: SB 14 Source Reduction Training	15	Berkeley	6 Nov 1996	Pat Bennett Mary Pride

POLLUTION PREVENTION TRAINING PRESENTATIONS

January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
SB 14 for Inspectors	12	Santa Rosa	6 Nov 1996	Kathryn Barwick Fox
Pollution Prevention & Life Cycle Assessment in Manufacturing and Consumerism presented to: California State University-Sacramento, Dr. Ramzi Mahmood's Civil Engineering 174 Hazardous Waste Management class	18	CSUS Sacramento	2 Dec 1996	Robert Ludwig
ISO 14000 / Cal/EPA Pilot Project (Air and Waste Management Association)	60	Downey	6 Feb 1997	Kim Wilhelm
U.C. Riverside Extension: SB 14 Source Reduction Planning	14	Riverside	8 Feb 1997	Pat Bennett
Pollution Prevention / SB 14 for CUPAs California Environmental Health Association	20	Oakland	11 Feb 1997	Kathryn Barwick Fox
U.S. EPA Region IX MERIT Pollution Prevention Roundtable	30	Los Angeles	20 Feb 1997	Alan Ingham
SB 14 Right To Know project Government Conference on the Environment	15	Sacramento	21 Feb 1997	Dave Weightman
SB 14 Program Results Government Conference on the Environment	15	Sacramento	21 Feb 1997	Kathryn Barwick Fox
SB 14 for Inspectors	20	Contra Costa and Solano Counties	5 Mar 1997	Kathryn Barwick Fox

POLLUTION PREVENTION TRAINING PRESENTATIONS

January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
SB 14 for Inspectors	45	San Diego County	15 Mar 1997	Kathryn Barwick Fox
Pollution Prevention Training for Mexican Government Officials	40	Tijuana, Baja California, Mexico	20 Mar 1997	Dan Garza Pat Bennett Robert Ludwig
What's New in Pollution Prevention; Hazardous Waste Association	15	West Sacramento	21 Mar 1997	Kim Wilhelm
Changes to the Source Reduction Planning Act (SB 14); Environmental Law Forum	40	San Francisco	26 Mar 1997	Kim Wilhelm
National Pollution Prevention Roundtable SB 14 Community Right To Know	60-70	Denver, CO	2 April 1997	Dave Weightman
National Pollution Prevention Roundtable Facility Pollution Prevention Planning Program Results	40	Denver, CO	2 April 1997	Kathryn Barwick Fox
National Pollution Prevention Roundtable Chemical Use Reporting	70-80	Denver, CO	3 April 1997	Dave Hartley
Cal/EPA ISO 14000 Pilot Project; Hazardous Waste Association	20	Santa Clara	22 April 1997	Kim Wilhelm
Hazmacon presentation of SB 14 Program results	40	Santa Clara	22 April 1997	Kathryn Barwick Fox

POLLUTION PREVENTION TRAINING PRESENTATIONS

January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
SB 14 for Inspectors / El Segundo	30	El Segundo	7 May 1997	Kathryn Barwick Fox
Overview of OPPTD Pollution Prevention Program presented to the State Stormwater Quality Task Force Public Information / Public Participation Committee	10	San Francisco	8 May 1997	Robert Ludwig
SB 14 Community Right To Know project orientation for northern California environmental groups	12	Palo Alto	14 May 1997	Dave Weightman
Pollution Prevention for the Electronics Industry (Maquiladoras)	20-30	San Diego	15 May 1997	Dan Garza
SB 14 Community Right To Know project orientation for southern California environmental groups	7	Glendale	5 June 1997	Dave Weightman
Environmental Technology Protocol Workshop: Pollution Prevention Technology Certification	15	Berkeley	22 July 1997	Kim Wilhelm
U.S. EPA Region IX Sponsored Seminar: New "Wet" Cleaning Technology For Dry Cleaners --- Pollution Prevention Aspects of "Hazardous Waste Reduction Loan Program" for Dry Cleaners	15	San Francisco	3 Aug 1997	Phil Loder
SB 14 / Semiconductor Industry Association (meeting / discussion session)	15	San Jose	28 Aug 1997	Kim Wilhelm Stan Lau Dave Weightman

POLLUTION PREVENTION TRAINING PRESENTATIONS
January 1996 through November 1998

ITEM	ATTEND	PLACE	DATE	STAFF
U.S. EPA Region IX MERIT Pollution Prevention Roundtable	35	Los Angeles	4 Sept 1997	Alan Ingham
Pollution Prevention Presentation given to the Indonesia Press in Jakarta, Indonesia	30	Jakarta, Indonesia	8 Sept 1997	Dave Hartley
Presentation on the History of the Development of the National Pollution Prevention Roundtable and the Status of Pollution Prevention in the U.S.	150	Jakarta, Indonesia	10 Sept 1997	Dave Hartley
California Energy Commission Industrial Assessment Workshop: Pollution Prevention & Energy Conservation	30-100	San Ramon	18 Sept 1997	David Weightman
Pacific Industrial Business Association: presentation on SB 14 focusing on our sponsorship of community group reviews of SB 14 documents	30	Redwood City	25 Sept 1997	Kathryn Barwick Fox
Sacramento Area Pollution Prevention Committee Meeting: "Overview of OPPTD"	15	Sacramento	30 Sept 1997	Robert Ludwig
Fall 1997 California Water Environment Association (CWEA): Pollution Prevention Conference Industrial Pollution Prevention Session	20	Concord	13 Oct 1997	Pat Bennett
Chemical Industry Council	20	Long Beach	21 Oct 1997	Dave Weightman
Chemical Industry Council	20	Pleasanton	23 Oct 1997	Dave Weightman

POLLUTION PREVENTION TRAINING PRESENTATIONS

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ITEM	ATTEND	PLACE	DATE	STAFF
Western Regional Pollution Prevention Network (WRPPN) Panel Discussion at the WRPPN Conference	150	Los Gatos	19 Nov 1997	Dave Hartley
Introduction to Pollution Prevention presented to: California State University-Sacramento, Dr.Ramzi Mahmood's Civil Engineering 174 Hazardous Waste Management class	26	Sacramento	1 Dec 1997	Robert Ludwig
East Indian Delegation	10	San Francisco	17 Dec 1997	Alan Ingham Arvind Shah
1998 CWEA Industrial & Hazardous Waste Conference: "Certified Unified Program Agency (CUPA) & Pollution Prevention: What's The Connection?"	75	Waterford Hilton in Huntington Beach	10 Feb 1998	Kathryn Barwick Fox Robert Ludwig
SB 14 Training for CUPA inspectors (part of DTSC State Regulatory Program Division "Advanced CUPA Training")	100	Sacramento	25 Feb 1998	Kathryn Barwick Fox
Santa Clara Valley / Peninsula Industry Business Association (PIBA) Conference: "Creating Business Advantage: Translating Environmental Health and Safety Management Strategies Into Action"	25	Redwood City	26 Feb 1998	David Weightman
SB 14 Training for CUPA Inspectors (Part of DTSC State Regulatory Program Division "Advanced CUPA Training")	35	Fresno	27 Feb 1998	Alan Ingham
SB 14 Training for CUPA at the Government Conference on the Environment (GCOE)	-40	Sacramento	11 March 1998	Kathryn Barwick Fox

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ITEM	ATTEND	PLACE	DATE	STAFF
Environmental Science 4: Environmental Regulations & Pollution Prevention	20	Moorepark College, CA	21 April 1998	Robert Ludwig
Moderated a Training Session on International Cleaner Production Programs at National Pollution Prevention Roundtable Conference	65	Cincinnati, OH	29 April 1998	Dave Hartley
The Dos and Don'ts of Water-Based Cleaning: A Workshop for Vendors Presentation on Proposed Guidance to Users of Parts Washers	115	Irwindale	29 April 1998	Pat Bennett Mike Horner
SB 14 Training for CUPA Inspectors (Part of DTSC/SRPD "Advanced CUPA Training)	130	Diamond Bar	29-30 April 1998	Alan Ingham
Pollution Prevention for Maquiladoras: The Electronics Industry Presentation on P2 Techniques Applicable to the Electronics Industry	50	Tijuana, Mexico	12 May 1998	Dan Garza Pat Bennett
Community Awareness and Emergency Response (CAER) Conference Presentation	35	Redondo Beach	13 May 1998	Kathryn Barwick Fox
P2 Integration Status Report to other DTSC Programs, Session 1 of 5	60	Glendale	6 May 1998	Kim Wilhelm
P2 Integration Status Report to other DTSC Programs, Session 2 of 5	45	Cypress	6 May 1998	Kim Wilhelm
P2 Integration Status Report to other DTSC Programs, Session 3 of 5	65	Berkeley	13 May 1998	Kim Wilhelm

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ITEM	ATTEND	PLACE	DATE	STAFF
P2 Integration Status Report to other DTSC Programs, Session 4 of 5	30	Sacramento Headquarters	21 May 1998	Kim Wilhelm
P2 Integration Status Report to other DTSC Programs, Session 5 of 5	20	Sacramento Region 1	28 May 1998	Kim Wilhelm
Pollution Prevention Workshop for Permit Writers and Enforcement Actions	20	McClellan AFB Sacramento	10-11 June 1998	Kathryn Barwick Fox
U.S. EPA Region IX Merit Partnership Roundtable Presentation on Hospital and Chemical Industry Reports	35	Los Angeles	9 July 1998	Alan Ingham
Regulations for Aqueous Cleaners in Auto Repair Shops (South Coast Air Quality Management District)	65	Diamond Bar	29 July 1998	Robert Ludwig
Introduction to Western Region Pollution Prevention Network for Hawaii Department of Environmental Quality	28	Hawaii	5 Aug 1998	Dave Hartley
Basic Pollution Prevention Training and Introduction to the Western Regional Pollution Prevention Network for Western Partnership for Environmental Technology Education (PETE)	30	Hawaii	6 Aug 1998	Dave Hartley
Federal Facilities Conference, Sept 14-16, 1998 "Using Pollution Prevention Plans to meet California's Source Reduction Planning Requirements"	50	Reno, NV	16 Sept 1998	Dan Garza
Eco-Tijuana Industrial '98, Sept 24-25, "California Pollution Prevention Program: SB 14 Program"	150	Tijuana, Mexico	24 Sep 1998	Dan Garza

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Pollution Prevention Week Seminar --- Dry Cleaners	20	Modesto	24 Sept 1998	Phil Loder
Presentation to Unified Program Agency Advisory Group (UPAAG): Pollution Prevention and California Unified Program Agencies (CUPAs)	20	Sacramento	8 Oct 1998	Kathy Barwick
How to Leverage Limited Resources to do Pollution Prevention	50	San Diego	14 Oct 1998	Robert Ludwig
Management of Water-Based Cleaners in the Auto Repair Industry	50	San Diego	15 Oct 1998	Robert Ludwig
Western Regional Pollution Prevention Network Conference "Establishing Western Region Pollution Prevention Priorities"	35	San Diego	15 Oct 1998	Dave Hartley
Western Regional Pollution Prevention Network Conference	30	San Diego	16 Oct 1998	Kathy Barwick
National Pollution Prevention Roundtable Workshop: Overview of International Pollution Prevention Activities	100	Hot Springs Arkansas	17 Nov 1998	Dave Hartley
U.S. EPA Region IX Merit Partnership Roundtable Update on SB 1916	25	Los Angeles	20 Oct 1998	Alan Ingham
Presentation to Santa Clara Pollution Prevention Committee	20	Santa Clara	28 Oct 1998	Kathy Barwick

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Chinese Environmental Regulatory Program Delegation	6	Sacramento	4 Nov 1998	Alan Ingham
Pollution Prevention for Permit Writers	20	Region 2 Office	10 Nov 1998	Kathy Barwick Maxine Richey
Environmental Management & Technology Exposition (EMAT West): SB 14 Workshop for Preparing 1999 Documents	35	Long Beach	16 Nov 1998	AlanIngham Phil Loder Stan Lau Arvind Shah Kim Wilhelm Pat Bennett
Management of Aqueous- Based Cleaners in Auto Repair Shops	60	L.A.County Fire Dept. Commerce	17 Nov 1998	Robert Ludwig
Pollution Prevention and Hazardous Waste Permits	20	DTSC Berkeley	19 Nov 1998	Maxine Richey